

- Be familiar with the PT
- All atoms of a given element have the same
    - density
    - number of protons
    - mass
    - number of electrons and neutrons
  - In the periodic table, the elements are arranged in
    - order of increasing metallic properties
    - order of increasing neutron content
    - order of increasing atomic number
    - reverse alphabetical order
  - In the periodic table, the rows are called \_\_\_\_\_ and the columns are called \_\_\_\_\_.
    - staffs, families
    - rows, groups
    - periods, groups
    - cogeners, families
  - Elements in Group 2A are known as the
    - alkaline earth metals
    - alkali metals
    - noble gases
    - halogens
  - Elements in Group 6A are known as the
    - alkaline earth metals
    - alkali metals
    - noble gases
    - halogens
  - Oxygen is a \_\_\_\_\_ and nitrogen is a \_\_\_\_\_.
    - metal, metalloid
    - nonmetal, metalloid
    - metalloid, metalloid
    - nonmetal, nonmetal
  - Potassium is a \_\_\_\_\_ and chlorine is a \_\_\_\_\_.
    - metal, nonmetal
    - nonmetal, metal
    - metal, metal
    - metalloid, metalloid
  - \_\_\_\_\_ are found uncombined, as monatomic species in nature.
    - Alkali metals
    - Halogens
    - Alkaline earth metals
    - Chalcogens
  - Which one of the following does not occur as diatomic molecules in elemental form?
    - hydrogen
    - sulfur
    - nitrogen
    - oxygen
  - Which one of the following does not occur as diatomic molecules in elemental form?
    - hydrogen
    - sulfur
    - nitrogen
    - oxygen
  - Which one of the following does not occur as diatomic molecules in elemental form?
    - hydrogen
    - sulfur
    - nitrogen
    - oxygen
  - Which one of the following is most likely to lose electrons when forming an ion?
    - P
    - N
    - Rb
    - F
  - Determine the number of particles and the amount of substance (in moles).
    - 9.50 x 10<sup>23</sup> Fe atoms
    - 2.13 x 10<sup>25</sup> Fe atoms
    - 3.82 x 10<sup>24</sup> Fe atoms
    - 2.62 x 10<sup>24</sup> Fe atoms
  - How many iron atoms are contained in 354 g of iron?
    - 9.50 x 10<sup>23</sup> Fe atoms
    - 2.13 x 10<sup>25</sup> Fe atoms
    - 3.82 x 10<sup>24</sup> Fe atoms
    - 2.62 x 10<sup>24</sup> Fe atoms
  - How many xenon atoms are contained in 2.36 moles of xenon?
    - 7.91 x 10<sup>23</sup> xenon atoms
    - 3.92 x 10<sup>24</sup> xenon atoms
    - 1.87 x 10<sup>25</sup> xenon atoms
    - 2.55 x 10<sup>23</sup> xenon atoms
  - How many atoms of oxygen are contained in 47.6 g of Al<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub>?
    - 1.10 x 10<sup>24</sup> O atoms
    - 1.23 x 10<sup>24</sup> O atoms
    - 3.68 x 10<sup>23</sup> O atoms
    - 2.96 x 10<sup>24</sup> O atoms
  - Define the terms *relative atomic mass* (*A<sub>r</sub>*) and *relative molecular mass* (*M<sub>r</sub>*).
    - The molar mass of potassium dichromate (K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) is \_\_\_\_\_ g/mol.
      - 294.18
      - 333.08
      - 255.08
      - 242.18
    - The molecular mass of urea ((NH<sub>2</sub>)<sub>2</sub>CO), a compound used as a nitrogen fertilizer, is \_\_\_\_\_ g/mol (rounded to one decimal place).
      - 43.0
      - 44.0
      - 60.1
      - 8.0
  - Solve problems involving the relationship between the amount of substance in moles, mass and molar mass.
    - How many moles of N<sub>2</sub>O<sub>4</sub> are in 76.3 g N<sub>2</sub>O<sub>4</sub>?
      - 1.00 mole
      - 7.02 x 10<sup>3</sup> moles
      - 0.829 moles
      - 1.42 x 10<sup>3</sup> moles
    - Name ionic and Molecular Compounds
      - NaCl
      - PbCl<sub>2</sub>
      - MnCl<sub>2</sub>
      - PbCl<sub>2</sub>
    - Which of the following compounds would you expect to be ionic?
      - CaO
      - SF<sub>6</sub>
      - H<sub>2</sub>O<sub>2</sub>
      - NH<sub>3</sub>
    - Of the choices below, which one is not an ionic compound?
      - NaCl
      - PbCl<sub>2</sub>
      - MnCl<sub>2</sub>
      - PbCl<sub>2</sub>
    - Magnesium reacts with a certain element to form a compound with the general formula MgX. What would the most likely formula be for the compound formed between potassium and element X?
      - KX
      - KX<sub>2</sub>
      - KX<sub>3</sub>
      - KX<sub>4</sub>
    - Which pair of elements is most apt to form an ionic compound with each other?
      - oxygen, fluorine
      - sulfur, fluorine
      - calcium, sodium
      - nitrogen, hydrogen
    - Which pair of elements is most apt to form a molecular compound with each other?
      - aluminum, oxygen
      - magnesium, iodine
      - barium, bromine
      - potassium, lithium
    - Which pair of elements is most apt to form a molecular compound with each other?
      - aluminum, oxygen
      - magnesium, iodine
      - barium, bromine
      - potassium, lithium
    - The charge on the iron ion in the salt Fe<sub>2</sub>O<sub>3</sub> is \_\_\_\_\_.
      - +1
      - +2
      - +3
      - 6
    - Which formula/name pair is incorrect?
      - Mg(MnO<sub>4</sub>)<sub>2</sub> magnesium permanganate
      - Mg(NO<sub>3</sub>)<sub>2</sub> magnesium nitrate
      - Mn(NO<sub>3</sub>)<sub>2</sub> manganese(II) nitrate
      - Mn(NO<sub>3</sub>)<sub>2</sub> manganese(II) nitrate
    - Mg<sub>3</sub>N<sub>2</sub>, magnesium nitride
      - Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> iron(III) sulfate
      - Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> iron(III) sulfate
      - Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> iron(III) sulfate
      - Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> iron(III) sulfate
    - Which one of the following is the formula of hydrochloric acid?
      - HClO<sub>4</sub>
      - HClO<sub>3</sub>
      - HClO<sub>2</sub>
      - HCl
    - Which one of the following compounds is chromium(II) oxide?
      - Cr<sub>2</sub>O<sub>3</sub>
      - Cr<sub>2</sub>O<sub>4</sub>
      - Cr<sub>2</sub>O<sub>5</sub>
      - Cr<sub>2</sub>O<sub>6</sub>
    - Which one of the following compounds is copper(I) chloride?
      - CuCl<sub>2</sub>
      - CuCl
      - CuCl<sub>3</sub>
      - CuCl<sub>4</sub>
    - The correct name for MgF<sub>2</sub> is \_\_\_\_\_.
      - magnesium difluoride
      - manganese difluoride
      - manganese bifluoride
      - magnesium fluoride
    - A correct name for Fe(NO<sub>3</sub>)<sub>2</sub> is \_\_\_\_\_.
      - ferrous nitrate
      - ferrous nitrate
      - ferrous nitrate
      - ferrous nitrate
    - The correct name for HNO<sub>3</sub> is \_\_\_\_\_.
      - nitric acid
      - hydrogen nitrate
      - pernitric acid
      - hyponitrous acid
    - The formula for the compound formed between aluminum ions and phosphate ions is \_\_\_\_\_.
      - AlP
      - Al<sub>3</sub>(PO<sub>4</sub>)<sub>3</sub>
      - Al(PO<sub>4</sub>)<sub>3</sub>
      - AlPO<sub>4</sub>

33. Which metal does not form cations of differing charges?  
 A) Sn B) Co C) Fe D) Cu **E) Na**
34. Which metal forms cations of differing charges?  
 A) K B) Al C) Cs **D) Sn** E) Ba
35. The correct name for  $\text{Ni}(\text{CN})_2$  is \_\_\_\_\_.  
 A) nickel (I) nitride  
 B) nickel (I) cyanide  
 C) nickel cyanate  
 D) nickel carbonate  
**E) nickel (II) cyanide**
36. The correct name for  $\text{SO}$  is \_\_\_\_\_.  
 A) sulfate  
**B) sulfide**  
 C) sulfur monoxide  
 D) sulfite  
 E) sulfur oxide
37. The correct name for  $\text{HClO}_3$  is \_\_\_\_\_.  
**A) chloric acid**  
 B) perchloric acid  
 C) hydrochlorous acid  
 D) chlorous acid  
 E) hydrochloric acid
38. The correct name of the compound  $\text{Na}_3\text{N}$  is  
 A) sodium azide  
 B) sodium trinitride  
**C) sodium nitride**  
 D) sodium nitrite  
 E) trisodium nitride
39. The name of  $\text{PCl}_3$  is \_\_\_\_\_.  
 A) potassium chloride  
**B) phosphorus trichloride**  
 C) phosphorus trichloride  
 D) tritriton potassium  
 E) monophosphorus trichloride
40. The correct name for  $\text{HClO}_2$  is \_\_\_\_\_.  
**A) chlorous acid**  
 B) chloric acid  
 C) hypochloric acid  
 D) perchloric acid  
 E) hypochlorous acid
41. A molecular formula always indicates  
 A) the isotope of each element in a compound  
 B) the simplest whole-number ratio of different atoms in a compound  
**C) the geometry of a molecule**  
 D) how many of each atom are in a molecule  
 E) which atoms are attached to which in a molecule

42. Which compounds do not have the same empirical formula?  
**A) CO, CO**  
 B)  $\text{C}_2\text{H}_4\text{COOCH}_3$ ,  $\text{CH}_3\text{CHO}$   
 C)  $\text{C}_2\text{H}_4\text{O}_2$ ,  $\text{C}_4\text{H}_4\text{O}_2$   
 D)  $\text{C}_2\text{H}_2$ ,  $\text{C}_4\text{H}_6$   
 E)  $\text{C}_2\text{H}_4$ ,  $\text{C}_4\text{H}_6$
43. An empirical formula always indicates  
 A) how many of each atom are in a molecule  
**B) the geometry of a molecule**  
 C) the simplest whole-number ratio of different atoms in a compound  
 D) the isotope of each element in a compound  
 E) which atoms are attached to which in a molecule
44. The molecular formula of a compound is always \_\_\_\_\_ the empirical formula.  
**A) different from**  
**B) an integral multiple of**  
 C) more complex than  
 D) simpler than  
 E) the same as
45. Determine the empirical formula from the percentage composition or from other experimental data.  
 45. Determine the empirical formula for a compound that is 36.86% N and 63.14% O by mass.  
 A)  $\text{NO}_2$  B)  $\text{NO}_3$   
 C)  $\text{N}_2\text{O}$  D)  $\text{NO}$   
**E)  $\text{N}_2\text{O}_3$**
46. Calculate the mass percent composition of sulfur in  $\text{Al}_2(\text{SO}_4)_3$ .  
 A) 9.372% B) 28.12%  
 C) 35.97% D) 21.38%  
**E) 42.73%**
47. Determine the empirical formula for a compound that is found to contain 10.15 g P and 34.85 g Cl.  
 A)  $\text{P}_2\text{Cl}_3$  B)  $\text{P}_2\text{Cl}_5$   
**C)  $\text{PCl}_3$**  D)  $\text{P}_2\text{Cl}_7$  E)  $\text{PCl}_5$
48. Calculate the mass percent composition of lithium in  $\text{Li}_3\text{PO}_4$ .  
 A) 26.75% B) 30.72%  
**C) 17.98%** D) 20.82% E) 55.27%

49. Determine the molecular formula for a compound that is 70.79% carbon, 8.91% hydrogen, 4.59% nitrogen, and 15.72% oxygen.  
**A)  $\text{C}_{10}\text{H}_7\text{NO}_2$**  B)  $\text{C}_8\text{H}_7\text{NO}_2$   
 C)  $\text{C}_{17}\text{H}_{12}\text{NO}_2$  D)  $\text{C}_{17}\text{H}_7\text{NO}_2$
50. Determine the molecular formula of a compound that is 49.48% carbon, 5.19% hydrogen, 28.85% nitrogen, and 16.48% oxygen. The molecular weight is 194.19 g/mol.  
**A)  $\text{C}_{10}\text{H}_8\text{N}_2\text{O}_2$**  B)  $\text{C}_8\text{H}_8\text{N}_2\text{O}$   
 C)  $\text{C}_{10}\text{H}_8\text{N}_2\text{O}$  D)  $\text{C}_{12}\text{H}_{12}\text{N}_2\text{O}_2$

# NOMENCLATURE REVIEW

## Molecular Compounds, Ionic Compounds, & Acids

### ANSWER KEY

- |                            |  |
|----------------------------|--|
| 1. barium sulfate          | 27. HBr                                |
| 2. ammonium phosphate      | 28. $\text{Cr}_2(\text{CO}_3)_3$       |
| 3. phosphorus pentabromide | 29. $\text{MgS}$                       |
| 4. magnesium sulfate       | 30. $\text{ICl}_3$                     |
| 5. calcium oxide           | 31. $\text{LiH}$                       |
| 6. phosphoric acid         | 32. $\text{NH}_4\text{OH}$             |
| 7. sodium carbonate        | 33. $\text{CaCl}_2$                    |
| 8. magnesium oxide         | 34. $\text{H}_2\text{Se}$              |
| 9. sulfur trioxide         | 35. $\text{Fe}_3\text{N}_2$            |
| 10. copper(II) nitrate     | 36. $\text{Al}(\text{OH})_3$           |
| 11. hydroiodic acid        | 37. $\text{SnF}_2$                     |
| 12. dinitrogen monoxide    | 38. $\text{SCL}_4$                     |
| 13. manganese(II) oxide    | 39. $\text{HgI}_2$                     |
| 14. silver nitrate         | 40. $\text{P}_2\text{O}_5$             |
| 15. diarsenic pentoxide    | 41. $\text{H}_2\text{SO}_4$            |
| 16. iron(III) oxide        | 42. $\text{Pb}(\text{NO}_3)_2$         |
| 17. hydrochloric acid      | 43. $\text{H}_2\text{O}$               |
| 18. dinitrogen trioxide    | 44. $\text{Na}_2\text{CO}_3$           |
| 19. hydrofluoric acid      | 45. $\text{HNO}_3$                     |
| 20. oxalic acid            | 46. $\text{HC}_2\text{H}_3\text{O}_2$  |
| 21. sodium bicarbonate     | 47. $\text{SiO}_2$                     |
| 22. silicon tetrabromide   | 48. $\text{H}_2\text{CO}_3$            |
| 23. copper(II) chloride    | 49. $\text{NaC}_2\text{H}_3\text{O}_2$ |
| 24. nitric acid            | 50. $\text{XeF}_6$                     |
| 25. tin(IV) oxide          | 51. $\text{Ni}(\text{NO}_3)_2$         |
| 26. barium hydroxide       | 52. $\text{KCl}$                       |